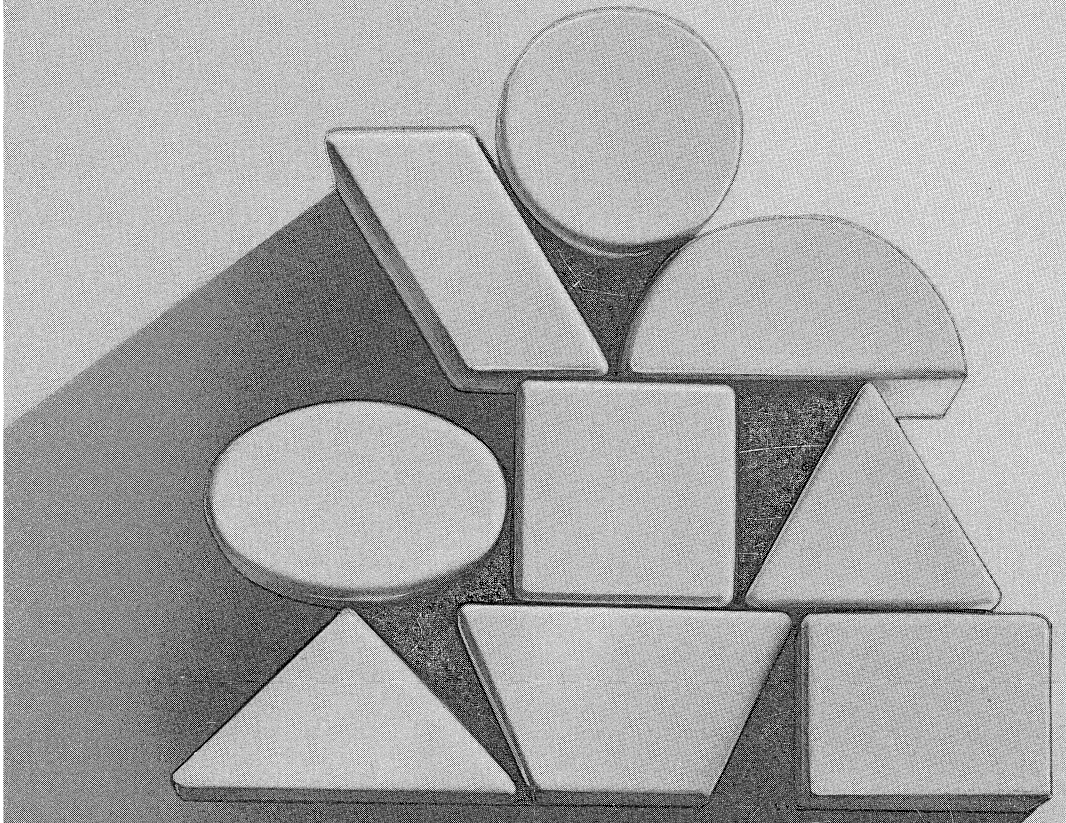
Loading Your MP/OS System



Data General

Loading Your MP/OS System

Data General

Data General Corporation, Westboro, Massachusetts 01581

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FIRST EDITION
(First Printing August, 1979)

Ordering No. 093-400006
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Printed in the United States of America
Rev. 00 August 1979

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Preface

In *Loading Your MP/OS System,* you will learn how to use the MP/OS software to bring up your MP/computer system and set up a program development environment.

When you start to work with this book, your system should be unpacked, the hardware connected together, and the processor, the terminal, and your line printer should have passed the DTOS diagnostic tests, and be "powered up". Check your Microproducts hardware self-study materials for the installation procedure, or contact your systems or service representative for hardware installation.

By the time you complete your work with this book, you should have some "feel" for how your work patterns will shape up as you work with your MP/Computer. Other books in this series will help you expand that feeling into a solid sense of how your MP/Computer works, and what it can do for you.

Organization of This Manual

Chapter 1, "Concepts and Overview", covers what you will be doing, in general terms, and explains why you should do it. We haven't tried to cover all of the theory behind the various tasks: other manuals in this series go into more depth on each topic. But we have tried to give you some idea of what is happening as you move through each step of the process.

Chapters 2 through 5 detail each step you need to take. You'll be activating the MP/OS Operating System, making duplicate copies of your release diskettes to protect against accidental loss, and setting up an "environment" in which you can develop your own programs most efficiently, given your particular hardware configuration.

These chapters tell you *exactly* what you need to do, and you will probably find it easiest if you follow the instructions as you read each section. If you make a mistake, just back up to the beginning of the current section, and start again. In the rare case where you can't correct the mistake in this way, check the Microproducts manual that covers the specific program you are using. These manuals cover error handling and correction in more detail.

Finally, the Appendices contain some useful reference information. Appendix A is a list of all the programs and other material you receive on the software release diskettes. Appendix B briefly describes how to insert and remove diskettes and disk cartridges from their respective disk drives.

Once you have accomplished the tasks outlined in *Loading Your MP/OS System,* we strongly recommend that you read *Learning to Use the MP/OS Operating System,* and practice using the system as it is explained in that manual.

Related Manuals

The list that follows gives a brief description of each of the other manuals which describe Microproducts and the MP/OS system.

- *An Introduction to Microproducts and MP/OS* describes the hardware and software in general terms, to give an overview of your MP/Computer and its capabilities.
- *Microproducts Hardware Systems Reference* gives a detailed functional description of the Microproducts line of microcomputers and related peripherals, board by board.
- *Learning to Use MP/OS* should be read by anyone who has never used MP/OS. It introduces the MP/OS file system and the Command Line Interpreter. A console session gives you step by step hands-on experience with your new MP/Computer.

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- *Assembly Language Programmer's Reference* is the main source of information for the assembly language programmer. It describes the instruction sets of MP/Computers in detail, and gives details of the Macroassembler and operating system.
- *MP/OS Utilities Reference* describes the utility programs available with the MP/OS system.
- *MP/Fortran IV Programmers' Reference* covers all of the features of this powerful high level language.
- *MP/Pascal Programmers' Reference* describes Data General's extended version of PASCAL.

Typesetting Conventions

When we mention a command in the course of the text, we will show it in **BOLD** upper case type.

When we show you how a particular command should be entered, we use upper case and a different typeface for the command line:

```
) MOUNT @DPX0<↓>
```

Note that the symbol:
<↓>
represents a New-line character, which you enter by pressing the New-line key at your console.

If the command you enter elicits a response from the system, we will represent the response in upper case *ITALICS*, to distinguish it from the command line. For example, the command above introduces a diskette to the system. If the diskette has a name, the system will tell you the name in response to the command:

FORTDISK

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Chapter 1
Concepts and Overview

Bootstrapping and Shutting Down the System

In order to work with the MP/OS operating system, you must first "bootstrap the system". When you are done working with MP/OS, you then "shut down" the system.

The Soft Control Panel program runs as soon as you power up the system. From it, you can bootstrap (or "boot") the operating system by invoking the Bootstrap program from the Soft Control Panel program.

When you invoke the Bootstrap program, it reads in a certain physical block on the disk or diskette in Drive 0. That block contains a program that finds and brings into memory the MP/OS system. This program then starts executing: your system is now "up".

At the close of your work session, you issue the command **BYE**. This command shuts down the system in an orderly way, so that no data is lost.

Programs You Will Use

During the course of the tasks outlined by this manual, you will use several programs. Here is a list of each of these programs, with a brief description of their uses.

- DCOPY - This program is the only one covered in this book that has its own system, and operates independently of the MP/OS operating system. You use it to copy all of the material on one disk to another disk.
- MP/OS - The operating system: a program which acts as an interface between you and the hardware, and makes it easier for you to create and execute your programs. The operating system basically allows you to use the hardware without knowing all the details of its operation.
- Command Line Interpreter (CLI) - The utility program that is the main interface between you at your console and the MP/OS system. You type CLI commands on the console in order to communicate with the operating system.
- Fixup - The disk repair program. Fixup can restore the integrity of the information structures on a disk or diskette after you make certain errors.
- DINIT - The disk initializer. Before MP/OS can write any data to a disk or diskette, the disk must be software formatted. Before you can bootstrap MP/OS from a disk, the system files must be installed on the disk. DINIT performs both of these functions.

What Is a Bootable Disk?

When a disk or diskette is "bootable", you can bootstrap the operating system from the disk. In order for a disk or diskette to be bootable, it must include several programs. Table 1.1 shows these programs, with a description of the way they must appear on the disk.

Filename	Description
Files installed by DINIT (and not user accessible):	
BOOTDPX.SA or BOOTDPD.SA or BOOTDPH.SA	Disk(ette) initial bootstrap program. DINIT chooses the correct version for the disk it is initializing.
MP_OS.SY and MP_OS.OL	The operating system.
FIXUP.SA	The disk repair program.
Files accessible to the user:	
CLI.PR and CLI.OL	Command Line Interpreter.
ERMES	Error message file for the CLI and other system programs.

Table 1.1 Minimum set of files necessary on a bootable diskette

Once you boot the system, the Bootstrap, FIXUP, and the operating system files are invisible both to you and to the system. This is because there are areas of the disk that you cannot access while the system is running. The Bootstrap, Fixup, and the operating system files are installed in these areas.

In addition, once the system is booted up, it must be able to find the CLI files (CLI.PR and CLI.OL), and it is helpful if the error message file, ERMES, is available as well. These files are not installed, however, so they are accessible to you and to the system.

The only bootable diskette you receive in the software release package is the INIT diskette, described below. Later you will build other bootable diskettes and disks by using either the DCOPY or DINIT programs.

The Software Release Diskettes

The MP/Computer Software is shipped on up to 7 diskettes:

- INIT - This diskette is bootable. It also contains user-accessible copies of the Bootstrap, FIXUP, and the system files, as well as certain important utilities. There are three versions of this diskette: INIT_601, for systems using an mN601 processor, INIT_100, for systems using an MP/100 processor, and INIT_200, for systems with an MP/200 processor. Only one of these is right for your system.
- UTIL - This diskette contains copies of the utilities available with your MP/OS system. This diskette is not bootable.
- SYSGEN - This diskette contains the programs that you'll need if you wish to generate your own tailored system. This diskette is not bootable.
- FORTDISK - You receive this diskette if you ordered MP/Fortran IV with your system. It contains the MP/Fortran IV compiler and libraries. The diskette is not bootable.
- PASCDISK - You receive this diskette if you ordered MP/Pascal with your system. This diskette contains the MP/Pascal compiler and libraries. The diskette is not bootable.

In Appendix A you can find a list of all of the files on each diskette, along with brief explanations of what each file contains.

Making Backup Copies

Once you have bootstrapped the system, the first thing you must do is make "backup" copies of each of the software release diskettes. This is very important: the diskettes you received are currently your only copies of all of the software you ordered, and if something happened to them, you would have to order new release diskettes.

Your Development Environment

Once you have your system up and running, and you have backed up the software release diskettes, you'll need to set up the "program development environment" that is right for you. This environment keeps the MP/OS operating system, the CLI, and those utility programs that you use most often available to you. In addition, you use disk space in this environment for writing your programs.

The most important part of a development system is your "master disk". This disk is the one you booted the system from, and the system stores any temporary files it creates on this disk.

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Your program development environment is partly dictated by your hardware configuration.

If your system has only diskette drives, the system master disk resides in diskette drive 0. The master diskette starts out as a bootable, but otherwise empty, diskette. You write and run your programs on this diskette.

In diskette drive 1 you place a diskette that contains other programs necessary for developing or executing your own programs. This could be either your UTIL diskette, with utility programs, the FORTDISK diskette, which holds the MP/Fortran IV compiler and libraries, or the SYSGEN diskette, which includes the programs you need if you wish to tailor your own system.

If you have a hard disk in your system, this will be your master disk, and you should copy all of the utility programs, or compilers, or SYSGEN programs, from the diskette to the hard disk. Disk I/O is faster than diskette I/O, and there is more room for your programs on a disk than on a diskette.

Initializing and Mounting

Any blank disk you want to write on must be "hardware formatted" and "software formatted" before it is used. Any disk supplied by Data General is already hardware formatted; if you have other disks, use the DTOS hardware formatter to prepare them for use. You use the DINIT (disk initializer) utility to software format your disks.

Also, before you can use any disk except the system master disk, you must introduce it to the system with the CLI command **MOUNT.** If you want to remove a disk from a disk drive while you are working, you must first **DISMOUNT** the disk.

The master disk is always **MOUNT**ed automatically as part of the bootstrapping process. You cannot **DISMOUNT** the system master disk, except by shutting down the system. The **BYE** command automatically dismounts all disks and diskettes.

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Chapter 2
How to Bootstrap Your System

The Prompt

Many programs display a symbol, called a *prompt*, to let you know that the program is waiting for you to type something. The particular character chosen as the prompt varies from program to program.

You may remember from Chapter 1 that when you power up your MP/Computer, the Soft Control Panel program immediately starts running. On your console screen you'll see some numbers and an exclamation point. You can safely ignore the numbers right now; but the exclamation point is the prompt for the Soft Control Panel program.

The Bootstrap Command

When you see this prompt, you may enter the bootstrap command. The command takes different forms, depending on which disk you wish to run the Bootstrap program from. (Note, however, that if you have more than one drive for any kind of disk, you can only run the Bootstrap from drive 0.) Table 2.1 shows the forms of the bootstrap command. Note that the Soft Control Panel will only recognize this command if you use a capital "L".

Disk Drive	Boot Command
0.3 Mb diskette drive (6038)	33L
10 Mb disk drive (6095)	100027L
12.5 Mb fixed disk drive (6102)	100026L
1.2 Mb diskette drive	N/A

Table 2.1 Forms of the bootstrap load command

Your first system master disk must be the INIT diskette, since at the moment it is the only bootable disk you have.

Choose the INIT release diskette that is correct for your system (INIT_601 for mN601 processor, INIT_100 for the MP/100, and INIT_200 for the MP/200). Insert this diskette in diskette drive 0. Refer to Appendix B if you need help inserting the diskette in the drive.

Power up your system, and type **33L**. In about 15 seconds, the system should respond with two messages, one to let you know that the MP/OS operating system has come up (and to identify the hardware —e.g., MP/200), and another to let you know that the CLI is running.

MP/OS REV. 1.00
MP/OS CLI REV. 1.00 Level 1
)

After these two messages, a right parenthesis appears: this is the CLI prompt. Note that the revision numbers may be different in the version you received.

Now you are ready to begin backing up your diskettes.

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Chapter 3
Making Backup Copies of Your Diskettes

If You Have a Dual Diskette Drive

The Stand-alone DCOPY Program

There is a "stand-alone" program that makes it very easy for you to make backup copies if you have a dual diskette drive. "Stand-alone" means that the program is a system that can run by itself, without the presence of an operating system.

We recommend that you use the software release diskettes only as originals for the DCOPY program to copy. Use the backup copies that you make for all other purposes.

To back up your diskettes, you take the following steps. You will need at least three blank diskettes.

- Use the INIT diskette to bootstrap the MP/OS system.
- Use the CLI command **BOOT** to replace the MP/OS system with the DCOPY program.
- Use DCOPY to back up as many diskettes as you like. You simply specify to the DCOPY program what diskette drive contains the master, and what diskette drive contains the blank diskette.
- When you have backups for all your release diskettes, shut down DCOPY, and boot the MP/OS system from your backup copy of the INIT diskette. Store the original copies of the release diskettes for future use.

Running the DCOPY Program

Here's how you start up the DCOPY program. The command:

) BOOT DCOPY<↓>

causes the MP/OS operating system to shut down, and DCOPY comes up in its place. This takes about 20 seconds. The program announces itself, and then asks you to put the diskettes in the drives, ready to be copied.

Use a *felt tip pen* to label a blank diskette with a name, date and revision number; then insert the blank in diskette drive 1. (Refer to the directions in Appendix B, if you are unsure of how to insert the diskette.) Now place the diskette you want to copy in drive 0.

Now you can tell DCOPY where the two diskettes are, and start the copy procedure.

SOURCE UNIT NAME? @DPX0 <↓>

DESTINATION UNIT NAME? @DPX1 <↓>

TYPE NEW-LINE TO START COPYING. <↓>
DISK COPY STARTED.

The program takes about two minutes to copy each diskette. When it's done, it will ask you what you want to do next.

DISK COPY TERMINATED

DO YOU WANT TO COPY ANOTHER DISKETTE? Y <↓>

As long as you answer "yes" to this question, you may continue to copy your release diskettes, without re-booting the DCOPY program. You should copy the INIT, UTIL, and SYSGEN diskettes, as well as FORTDISK and PASCDISK,

if you have them. Be patient! This process takes some time, but it will save you some potential headaches later on.

When you are finished backing up the release diskettes, you tell the program you do not want to copy another diskette. DCOPY then shuts down, and returns you to the Soft Control Panel program. On the console screen you'll see the exclamation point that serves as the Soft Control Panel prompt.

Now turn to Chapter 4, *Making a System Disk.*

If You Have Only One Diskette Drive

If you have one diskette drive, plus a hard disk drive, you use the CLI **COPY** command to make backup copies of your release diskettes. To do this, you must make the hard disk bootable, and bring up the system on the hard disk. Then you copy each diskette into a temporary file on the hard disk, place a blank diskette in the drive, and copy the temporary file from the hard disk to the new diskette.

Each of these steps is detailed below.

> **NOTE:** *For the purposes of this section, we have have assumed that you have the 6095 cartridge disk drive. However, if you have the 6102 fixed disk drive, you may still use these instructions if you make one small change: wherever you see "@DPD0", replace it with "@DPH0". Otherwise, the procedures are identical.*

You start this operation by placing your INIT diskette in the drive, and bootstrapping the system, as described in Chapter 2. This takes about fifteen seconds.

When the system is up, and you have the CLI prompt (a right parenthesis) on the console screen, we recommend that you set the system time and date.

Here is the general format of the command to set the time:

) **TIME** *hh:mm:ss*

The system time is on a twenty-four hour clock. So, if it is 3:30 in the afternoon, you would set the system time as:

) TIME 15:30:00<↓>

You set the system date in the same general way. Here is the command format:

) **DATE** *dd-mon-yr*

If today is the 10th of September, 1979, here is how you'd set the system date:

) DATE 10-SEP-79<↓>

To check that these commands work, you can use another form of the same commands, and the system will tell you the current system time and date, like this:

) TIME<↓>

15:32:12

) DATE<↓>

10-SEP-79

Now you may run the DINIT program to initialize the hard disk and install the system files. It is easy to run DINIT, but it will take about half an hour.

The DINIT Program

MP/OS stores data on disks in special structures. These structures are invisible to you, and they are designed to allow efficient access to your data files. They are also designed to be easy to reconstruct in case of a hardware failure. Dinit writes the initial software formats of these structures onto a new disk. This is called "initializing" the disk.

You start DINIT by issuing the CLI Execute command, **X.**

) X DINIT<↓>

DINIT announces itself, and you may begin to answer its questions.

DISK UNIT NAME? @DPD0 <↓>

MP/OS FORMAT THE DISK? Y <↓>

DISK I.D. (0 TO 15 CHARS)? HARD.DISK <↓>

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You may give the disk any I.D. you choose, up to 15 characters, or you may type a New-line. When you **MOUNT** a disk, the CLI writes its I.D. (if any) on your console screen. You may also specify the disk I.D. as part of the input to a **MOUNT** command.

THE FOLLOWING PATTERNS ARE AVAILABLE:

#1 - 155555
#2 - 133333
#3 - 066666
#4 - 000000
#5 - 177777

RUN WHICH PATTERNS? 1 2 3 <↓>

It's important to run several patterns on your disk: this allows DINIT to identify and mark any bad blocks before the disk is used. Each pattern takes about eight minutes to run. (No other step in the backup process will take as long as this one.)

DINIT will give you a status message when it starts to run each pattern, and will let you know at the end of all tests how many bad blocks the program found.

-- RUNNING PATTERN #1 (155555)
-- RUNNING PATTERN #2 (133333)
-- RUNNING PATTERN #3 (066666)

BAD BLOCKS = 0

NUMBER OF FILES? 1 <↓>

ROUNDED UP TO 1016

DINIT always rounds the number of files the disk can hold to the nearest multiple of 1016. When it's done formatting the disk, it displays the message:

DISK IS SOFTWARE FORMATTED

Next DINIT asks you if you want to install a Bootstrap, Fixup, and the system files on this disk. Since you are building a bootable disk, you answer yes to all these questions.

INSTALL A BOOTSTRAP? Y <↓>
DISK BOOTSTRAP INSTALLED

INSTALL FIXUP? Y <↓>
FIXUP INSTALLED

INSTALL MP/OS? Y <↓>

SYSTEM PATHNAME (NL FOR MP_OS.SY)? <↓>

MP/OS INSTALLED
)

You install the standard operating system files by typing a New-line, and then DINIT terminates, returning control to the CLI. The CLI prompt appears on the screen again.

When you're ready to learn more about the DINIT program, refer to the *MP/OS Utilities Reference,* Section 6, Disk Initialization.

Making the Hard Disk a System Disk

DINIT does not move a copy of the CLI to the initialized disk, and as you may remember, the disk will not boot without the CLI.

In addition, you are later going to need the Move and DINIT utilities, so you can move them now as well.

To move these programs to the disk, you must first **MOUNT** the disk.

) MOUNT @DPD0<↓>

HARD.DISK

Now you may use the Move utility to transfer these files from the INIT diskette to the hard disk. The **/V** in the command line means that the program will list each file that it moves successfully.

) X MOVE/V @DPD0: CLI.PR CLI.OL ERMES<↓>

@DPX0:CLI.PR
@DPX0:CLI.OL
@DPX0:ERMES

) X MOVE/V @DPD0: MOVE.PR DINIT.PR<↓>

@DPX0:MOVE.PR
@DPX0:DINIT.PR

> **NOTE:** *Except that you may use upper case or lower case letters, (and that you use "@DPH0:" if you have the 6102 disk), you must type the command exactly as it is shown here. If you get an error (or warning) message from the CLI, check to make sure that you included the at-sign (@), the colon (:), the spaces, and the periods exactly as shown. Repeat the command if you left something out the first time.*

Your hard disk is now bootable. You can prove this by typing:

```
) BOOT @DPD0<↓>
```

The system gives the following messages, as it shuts down the system on one disk, and brings it up on the other:

```
MP/OS    REV. 1.00
MP/OS  CLI REV. 1.00 LEVEL 1
)
```

It also shows the I.D. of your hardware (e.g., MP/200). Remember that the revision numbers that you see may be different from the ones shown here.

Making the First Backup Diskettes

Now, for each release diskette, you copy the diskette's contents to a temporary file on the disk, replace the release diskette in the drive with a blank diskette, and then copy the temporary file from the hard disk to the new diskette.

The INIT diskette is already in the diskette drive, because we originally bootstrapped the system from there. Type this CLI command to copy the contents of INIT into a temporary file on the disk:

```
) COPY TEMP @DPX0<↓>
```

This copy takes about three minutes. While you're waiting for the CLI prompt to appear again, take a blank diskette. With a felt tip pen, label it with a name (such as "Init_backup"), the date, and a revision number. Now remove the INIT diskette from the drive, and put the blank diskette in its place. The following CLI command will transfer all the INIT files to this new diskette:

```
) COPY @DPX0 TEMP<↓>
```

This takes about a minute and a half. You now have a backup for the INIT diskette. Store the original in a safe place.

Backing Up the Rest of the Diskettes

Place another release diskette in the drive.

Now, in order to copy its contents into our temporary file, we must delete the old temporary file from the disk. This form of the COPY command will delete the old TEMP file, before placing any new material in the file:

```
) COPY/D TEMP @DPX0<↓>
```

Next, you replace the release diskette with a blank diskette, just as you did before, and type:

```
) COPY @DPX0 TEMP<↓>
```

Repeat this process for each of the remaining diskettes. Store the original release diskettes in a safe place.

> **NOTE:** *MAKE SURE that you never copy the TEMP file onto one of your original release diskettes.*

When you have backed up all of the release diskettes using one diskette drive plus a hard disk, turn directly to Chapter 5. You have already made your system disk, so you do not need to read Chapter 4.

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Chapter 4
Making a System Disk

As we explained in Chapter 1, the system master disk is the disk from which you boot the operating system. The system stores its temporary files on this disk. Also, the system disk is the center of your program development environment.

If you have only one diskette drive, plus a hard disk drive, you made your system disk in the course of following the instructions in Chapter 3. You should skip this chapter, and go on to Chapter 5.

This chapter is for you if you have a dual 0.3 Mb diskette drive. The chapter is divided into two sections: the first part is for those who have only a dual 0.3 Mb diskette drive, while the second part is for those who have a hard disk drive as well.

If you have only a dual 0.3 Mb diskette drive, your system master diskette resides in diskette drive 0. You must have a separate master diskette for each program you are developing.

If you have a hard disk, then you make that your system master disk.

Dual Diskette Drive Only

You must first boot the system with your backup INIT diskette. Place the diskette in drive 0, and follow the instructions in Chapter 1. When the system comes up, you place a blank diskette in drive 1, and "initialize" it.

The DINIT Program

MP/OS stores data on disks in special structures. These structures are invisible to you, and they are designed to allow efficient access to your data files. They are also designed to be easy to reconstruct in case of a hardware failure. DINIT writes the initial software formats of these structures onto a new disk. This is called "initializing" the disk.

You start DINIT by issuing the CLI Execute command, **X.**

```
) X DINIT<|>
```

DINIT announces itself, and you may begin to answer its questions.

DISK UNIT NAME? @DPX1 <|>

MP/OS FORMAT THE DISK? Y <|>

DISK I.D. (0 TO 15 CHARS)? SYSDISK.1 <|>

You may give the disk any I.D. you choose, up to 15 characters, or you may type a New-line. When you **MOUNT** a disk, the CLI writes the disk's I.D. (if any) to the console screen. You may also specify the disk I.D. as part of the input to a **MOUNT** command.

THE FOLLOWING PATTERNS ARE AVAILABLE:

#1 - 155555
#2 - 133333
#3 - 066666
#4 - 000000
#5 - 177777

RUN WHICH PATTERNS? 1 2 3 <|>

It's important to run several patterns on your disk: this allows DINIT to identify and mark any bad blocks before the disk is used. Each pattern takes about two minutes to run on a diskette, so be patient.

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DINIT will give you a status message when it starts to run each pattern, and will let you know at the end of all tests how many bad blocks it found.

-- RUNNING PATTERN #1 (155555)
-- RUNNING PATTERN #2 (133333)
-- RUNNING PATTERN #3 (066666)

BAD BLOCKS = 0

NUMBER OF FILES? 1 <↓>

ROUNDED UP TO 1016

DINIT always rounds the number of files the disk can hold to the nearest multiple of 1016. When it's done formatting the disk, it displays the message:

DISK IS SOFTWARE FORMATTED

Next, DINIT asks you if you want to install a Bootstrap, Fixup, and the system files on this diskette. Since you are building a bootable diskette, you answer yes to all these questions.

INSTALL A BOOTSTRAP? Y <↓>
DISK BOOTSTRAP INSTALLED

INSTALL FIXUP? Y <↓>
***FIXUP INSTALLED*

INSTALL MP/OS? Y <↓>
SYSTEM PATHNAME (NL FOR MP_OS.SY)?
<↓>
MP/OS INSTALLED
)

You install the standard operating system files by typing a New-line, and then DINIT terminates, returning control to the CLI. The CLI prompt appears on the screen again.

When you're ready to learn more about the DINIT program, refer to the *MP/OS Utilities Reference,* Section 6, Disk Initialization.

Making a System Disk

DINIT does not move a copy of the CLI to the initialized diskette, and as you may remember, the diskette is not bootable without the CLI.

In your program development work, you will need the DINIT and MOVE utilities, so you will also move them now.

To move these programs to the diskette, you must first **MOUNT** it.

) MOUNT @DPX1<↓>

SYSDISK.1

Now you may use the Move utility to transfer these files from the INIT diskette to the hard disk. The **/V** in the command line means that the program will list each file that it moves successfully.

) X MOVE/V @DPX1: CLI.PR CLI.OL ERMES<↓>

@DPX0:CLI.PR
@DPX0:CLI.OL
@DPX0:ERMES

) X MOVE/V @DPX1: MOVE.PR DINIT.PR<↓>

@DPX0:MOVE.PR
@DPX0:DINIT.PR

> **NOTE:** *Except that you may use upper case or lower case letters, you must type the command exactly as it is shown here. If you get an error (or warning) message from the CLI, check to make sure that you included the at-sign (@), the colon (:), and the periods exactly as shown. Repeat the command if you left something out the first time.*

The new diskette is now bootable. Take the system down, and try out the new diskette. Here's the procedure:

BYE<↓>

The system gives the following message as it shuts down:

MP/OS CLI TERMINATING

SYSTEM TERMINATING

Remove the backup INIT diskette from drive 0, and transfer the new diskette from drive 1 to drive 0. (Remember that the Bootstrap always looks to the disk in drive 0 for the system files.)

Now bootstrap the system from the new diskette, and then turn to Chapter 5.

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If You Have a Dual Diskette Drive and a Hard Disk

You must first boot the system from the backup INIT diskette in drive 0. Follow the instructions in Chapter 1.

When the system is up, and you have the CLI prompt (a right parenthesis) on the console screen, we recommend that you set the system time and date.

Here is the general format of the command to set the time:

) **TIME** *hh:mm:ss*

The system time is on a twenty-four hour clock. So, if it is 3:30 in the afternoon, you would set the system time as:

) TIME 15:30:00<↓>

You set the system date in the same general way. Here is the command format:

) **DATE** *dd-mon-yr*

If today is the 10th of September, 1979, here is how you'd set the system date:

) DATE 10-SEP-79<↓>

To check that these commands work, you can use another form of the same commands, and the system will tell you the current system time and date, like this:

) TIME<↓>

15:32:12

) DATE<↓>

10-SEP-79

Now you may "initialize" the hard disk, using the DINIT program. It is easy to run DINIT, but it will take about half an hour.

> **NOTE:** *For the purpose of simplicity, we have assumed that you have a 6095 cartridge disk. If you have the 6102 fixed disk instead, you may follow all of the instructions below, if you make one simple change: wherever you see "@DPD0", replace it with "@DPH0". Otherwise, the procedures are exactly the same.*

The DINIT Program

MP/OS stores data on disks in special structures. These structures are invisible to you, and they are designed to allow efficient access to your data files. They are also designed to be easy to reconstruct in case of a hardware failure. Dinit writes the initial software formats of these structures onto a new disk. This is called "initializing" the disk.

You start DINIT by issuing the CLI Execute command, **X.**

) X DINIT<↓>

DINIT announces itself, and you may begin to answer its questions.

DISK UNIT NAME? @DPD0 <↓>

MP/OS FORMAT THE DISK? Y <↓>

DISK I.D. (0 TO 15 CHARS)? HARD.DISK <↓>

You may give the disk any I.D. you choose, up to 15 characters, or you may type a New-line. (When you **MOUNT** a disk, the CLI writes the disk's I.D. (if any) on your console screen. You may also specify the disk I.D. as part of the input to a **MOUNT** command.)

THE FOLLOWING PATTERNS ARE AVAILABLE:

#1 - 155555
#2 - 133333
#3 - 066666
#4 - 000000
#5 - 177777

RUN WHICH PATTERNS? 1 2 3 <↓>

It's important to run several patterns on your disk: this allows DINIT to identify and mark any bad blocks before the disk is used. Each pattern takes about eight minutes to run. (No other step in the backup process will take as long as this one.)

DINIT will give you a status message when it starts to run each pattern, and will let you know at the end of all tests how many bad blocks the program found.

-- RUNNING PATTERN #1 (155555)
-- RUNNING PATTERN #2 (133333)
-- RUNNING PATTERN #3 (066666)

BAD BLOCKS = 0
NUMBER OF FILES? 1 <↓>

ROUNDED UP TO 1016

DINIT always rounds the number of files the disk can hold to the nearest multiple of 1016. When it's done formatting the disk, it displays the message:

DISK IS SOFTWARE FORMATTED

Next, DINIT asks you if you want to install a Bootstrap prgram, Fixup, and the system files on this disk. Since you are building a bootable disk, you answer yes to all these questions.

INSTALL A BOOTSTRAP? Y <↓>
DISK BOOTSTRAP INSTALLED

INSTALL FIXUP? Y <↓>
FIXUP INSTALLED

INSTALL MP/OS? Y <↓>

SYSTEM PATHNAME (NL FOR MP_OS.SY)?
<↓>
MP/OS INSTALLED

)

You install the standard operating system files by typing a New-line, and then DINIT terminates, returning control to the CLI. The CLI prompt appears on the screen again.

Making the Hard Disk a System Disk

DINIT does not move a copy of the CLI to the initialized disk, and as you may remember, the disk will not boot without the CLI.

In addition, you are going to need the Move and DINIT utilities when you are developing new programs, so you will now transfer copies of them as well.

To place copies of these files on the disk, you must first **MOUNT** the disk.

) MOUNT @DPD0<↓>

HARD.DISK

Now you may use the MOVE utility to transfer copies of these files from the INIT diskette to the hard disk. The /V in the command line means that the program will list the name of each file that it moves successfully.

) X MOVE/V @DPD0: CLI.PR CLI.OL ERMES<↓>

@DPX0:CLI.PR
@DPX0:CLI.OL
@DPX0:ERMES

) X MOVE/V @DPD0: MOVE.PR DINIT.PR<↓>

@DPX0:MOVE.PR
@DPX0:DINIT.PR

> **NOTE:** *Except that you may use upper case or lower case letters, (and that you use "@DPH0:" if you have the 6102 disk), you must type the command exactly as it is shown here. If you get an error (or warning) message from the CLI, check to make sure that you included the at-sign (@), the colon (:), the spaces, and the periods exactly as shown. Repeat the command if you left something out the first time.*

Your hard disk is now bootable. You can prove this by typing:

) BOOT @DPD0<↓>

The system gives the following messages, as it shuts down the system on the diskette, and brings it up on the hard disk:

MP/OS REV. 1.00
MP/OS CLI REV. 1.00 LEVEL 1
)

Remember that the revision numbers shown on your screen may be different than those shown above.

Now set the system time and date. If you need help, refer to the description of the **TIME** and **DATE** commands at the beginning of this section, "If You Have a Dual Diskette Drive and a Hard Disk".

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Chapter 5
Your Program Development Environment

Your program development environment provides access to the system utility programs and other programs that you need to develop your own work, while leaving you enough space on the disk so you have room to store and execute your programs.

Dual Diskette Drive Only

If you have only a dual diskette drive, your development environment is somewhat restricted. At any one time, you may have the system master diskette in drive 0, and one of the other software diskettes in drive 1. For example, if you need to edit an MP/Fortran IV program, and then execute it, you must have the UTIL diskette in drive 1 while you are editing the program, and then replace the UTIL diskette with FORTDISK, which contains the MP/FORTRAN IV compiler and libraries. The program itself continues to reside on the system disk.

You must also create a separate system master diskette for every large program you wish to develop.

Generating a Tailored System

One of your release diskettes contains the SYSGEN programs you need if you wish to generate your own system. In order to use these programs, you build a system master disk, and place it in Drive 0. Then you place your SYSGEN backup diskette in drive 1. Appendix A of this manual lists the programs contained on the SYSGEN diskette. For instructions on how to use these programs, turn to Appendices L, M, and N in the *Assembly Language Programmer's Reference,* DG No. 093-400001.

The LOGON.CLI File

The file LOGON.CLI contains a series of CLI commands that are executed automatically when the system comes up. This file is useful in a dual diskette environment, because it can tell the system that when you refer to a file, it should search both diskettes before it gives up.

For now, don't worry about exactly what this means: that is explained in the CLI manual, which you'll be reading soon. Just type in this command:

```
) CREATE/I LOGON.CLI<↓>
```

The CLI will respond by giving you a double prompt:

```
) )
```

This double prompt means that you may begin inserting text into the file LOGON.CLI. When you are through inserting text, you type in another prompt, and a New-line, and you'll be able to issue another command to the CLI.

Here's the text for LOGON.CLI. For now, type it in *exactly* as you see it here.

```
) ) MOUNT @DPX1<↓>

) ) SEARCHLIST @DPX0:, @DPX1:<↓>

) ) WRITE SET SYSTEM DATE AND TIME<↓>

) ) ) <↓>
```

To check your work, issue this command to the CLI:

) TYPE LOGON.CLI<↓>

This is what you should see:

MOUNT @DPX1
SEARCHLIST @DPX0:, @DPX1:
WRITE SET SYSTEM DATE AND TIME

Now, every time you boot the system from diskette drive 0, the system will mount the diskette in drive 1 before it gives you the CLI prompt. This means that *before* you boot the system, you should insert diskettes in *both* drives.

Also, as soon as the CLI comes up when you first boot the system, you'll see the reminder message:

SET SYSTEM DATE AND TIME

If you forget to put a diskette in drive 1 before you boot the system, you will get the following message:

ERROR: DEVICE IS OFF LINE
MOUNT,@DPX1

Once the system is up, you can rectify this error. Insert a diskette in drive 1, and then type:

) LOGON<↓>

In response to this command, the CLI will again execute the commands in the LOGON.CLI file.

Now that both drives are automatically mounted when the system comes up, don't forget to **DISMOUNT** the diskette in drive 1 if you wish to change to a new diskette while the system is running.

If You Have a Hard Disk and One or More Diskette Drives

In a system that contains at least one hard disk drive, and at least one diskette drive, your system master disk will nearly always be the hard disk.

You can move all of the utility and high-level language files from the release diskettes onto the hard disk, as we will show you in a moment. This means that every program supplied to you is available on the disk, without switching from diskette to diskette, or waiting for diskette I/O to complete.

You do all of your program development on the hard disk as well: you'll use the diskette drive mainly for making backup copies of important programs as you develop them.

Moving the Utilities and Language Files to the Hard Disk

You are going to move the contents of the UTIL diskette and the contents of FORTDISK and PASCDISK, if you have them.

Put one of your backup diskettes in drive 0, and type:

) MOUNT @DPX0<↓>

The CLI will respond with the I.D. of the diskette in drive 0.

) X MOVE/V/FROM @DPX0:<↓>

MAKE SURE you include the **/FROM** in the command line! Otherwise you may write over everything on your diskette.

This version of the **MOVE** command moves a copy of every file on the diskette. Because you use the **/V** in the command line, the Move utility lists on the console screen the name of each file moved.

When the first diskette is completely copied onto the disk, (that is, when you have the CLI prompt again), type:

) DISMOUNT @DPX0<↓>

and remove that diskette from the drive. Then repeat the whole process with the next diskette. Each Move will take a few minutes.

> **NOTE:** *Some of the files are duplicated on several of the release diskettes. This means that when you move the entire contents of more than one diskette to the hard disk, you will get error messages saying that some files "already exist". Don't worry about these error messages. They just mean that the Move utility will not put two copies of the same thing onto the hard disk.*

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Sysgen

Unless you wish to generate your own system, you will not need to copy the SYSGEN files onto the hard disk. If you decide you do need these programs, you can copy them onto the disk exactly as you copied your other backups of the release diskettes.

Instructions for using the SYSGEN programs appear in Appendices L, M, and N of the *Assembly Language Programmer's Reference,* DG No. 093-400001.

What Now?

Now your program development environment is ready to use. We suggest you shut down the system for now, with this command:

```
) BYE<↓>
```

MP/OS CLI TERMINATING
SYSTEM TERMINATING

Now continue your reading with *An Introduction to MP/OS.*

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Appendix A
Contents of MP/OS Software Release Media

Contents of MP/OS Release Diskettes

You may receive up to seven diskettes containing the software released for MP/Computers.

You receive three diskettes called INIT. The INIT_601 diskette contains software that will run on the mN601 central processor. The INIT_100 diskette software runs on the MP/100. And the INIT_200 diskette software runs on the MP/200. Make sure that you use the diskette that is right for your system.

You also receive a UTIL diskette, which contains all of the MP/OS utility programs, and the SYSGEN diskette, which contains the programs you'll need if you wish to generate your own tailored system.

In addition, if you ordered MP/FORTRAN IV or MP/Pascal, you receive one diskette for each language: these diskettes contain the compiler and libraries.

The tables below list the contents of each diskette, with a brief description of each file.

Filename	Description
CLI.PR and CLI.OL	Command Line Interpreter program and overlay files.
ERMES	Error message file.
ERMES_OBS	Directory containing the object files used to build ERMES.
FIXUP.PR	Disk repair program.
MOVE.PR	File transfer program.
DCOPY.BPG	Stand-alone disk copy program (bootable).
DINIT.PR	Disk initialization program.
The following files are used only for installation by DINIT:	
MP_OS.SY and MP_OS.OL	MP/OS operating system.
FIXUP.SA	Stand-alone version of disk repair program.
BOOTDPD.SA	Bootstrap for 10 Mb disk.
BOOTDPH.SA	Bootstrap for 12.5 Mb disk.
BOOTDPX.SA	Bootstrap for 0.3 Mb diskette.
BOOTDPY.SA	Bootstrap for 1.2 Mb diskette.

Table A.1 Contents of the INIT software release diskette

Filename	Description
MASM.PR	Macroassembler program.
MASMXR.PR	Cross reference program for Macroassembler.
MASM.PS	Default Macroassembler symbol file.
SPEED.PR	Text editor program.
NBID.SR	Nova instruction definition parameter file.
MP100ID.SR	MP/100 instruction definition parameter file.
MP200ID.SR	MP/200 instruction definition parameter file.
NSKID.SR	NOVA Skip instruction definition parameter file.
MPARU.SR	MP/OS user parameter file.
SYSID.SR	MP/OS system call definition parameter file.
BIND.PR and BIND.OL	Binder program.
FDISP.PR	File display and comparison program.
FEDIT.PR	File editor program.
LED.PR	Library builder program.
PROMLOAD.PR	Prom burning utility program.
MAKEBOOT.PR	Program to make a stand-alone program bootable.
MSL.LB	MP/OS subroutine library.
ECHO.SR	Source file for example in *Learning to Use MP/OS.*
HELP	Directory containing data files for CLI **HELP** command.

Table A.2 Contents of the UTIL software release diskette

Filename	Description
SYSGEN.PR and SYSGEN.OL	System generation program.
SYSGEN.DATA	Data file for system generation program.
SYSG.BIND.CLI and SYSG.MASM.CLI	CLI macros used by SYSGEN program.
MICRON.LB and MICRON2.LB	MP/OS system libraries.
BIND.PR and BIND.OL	Binder program.
MASM.PR	Macroassembler program.
MASMXR.PR	Cross reference program for Macroassembler.
MICRON.PS	Macroassembler symbol file used by SYSGEN program.

Table A.3 Contents of the SYSGEN software release diskette

Filename	Description
PASCAL.PR and PASCAL.OL	MP/Pascal compiler.
PASCAL.LB	MP/Pascal run-time library.
MP/Pascal include files:	
CTASK_PAK.PAS	
DEV_CHAR.PAS	
DINT2ST.PAS	
DOUBLE.PAS	
DSTAT_PAK.PAS	
ERROR_CODES.PAS	
FILE_PARS.PAS	
FSTAT_PAK.PAS	
GET_MESSAGE.PAS	
INDEX.PAS	
INFO_PAK.PAS	
IO_CALLS.PAS	
OVLY.PAS	
REAL2STR.PAS	
SINT2ST.PAS	
STR2DINT.PAS	
STR2REAL.PAS	
STR2SINT.PAS	
SYSCALL.PAS	
SYSLIB.PAS	
TMSG_PAK.PAS	

Table A.4 Contents of the PASCAL software release diskette

Filename	Description
FORT4.PR	MP/FORTRAN IV compiler.
FORT4.LB	MP/FORTRAN IV run-time library.
FORT4MT.LB	MP/FORTRAN IV multi-tasking library.
MASM.PR	Macroassembler program.
FORT4.PS	Macroassembler symbol table for MP/FORTRAN IV.
FORT4OP.PR and FORT4OP.OL	MP/FORTRAN IV optimizer program.
MASMXR.PR	Cross reference program for Macroassembler.
BIND.PR and BIND.OL	Binder program.

Table A.5 Contents of the FORT4 software release diskette

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Filename	Description
PASCAL.LB	MP/Pascal run-time library.
PASCAL.PR and PASCAL.OL	MP/Pascal compiler.
MMSL.LB	MP/OS subroutine library.
MICREM.OB	System call translator object file.
MERMES	Error message file.
PASC_MERMES.OB	Object file for MP/Pascal error messages; used to build MERMES.
SYS_MERMES.OB	Object file for system error messages; used to build MERMES.
MP/Pascal include files:	
OVLY.PAS	
IO_CALLS.PAS	
SYSCALL.PAS	
SYSLIB.PAS	
FILE_PARS.PAS	
ERROR_CODES.PAS	
DEV_CHAR.PAS	
CTASK_PAK.PAS	
FSTAT_PAK.PAS	
DSTAT_PAK.PAS	
INFO_PAK.PAS	
TMSG_PAK.PAS	
INDEX.PAS	
DINT2ST.PAS	
SINT2ST.PAS	
STR2DINT.PAS	
STR2SINT.PAS	
DOUBLE.PAS	
REAL2STR.PAS	
STR2REAL.PAS	
GET_MESSAGE.PAS	

Table A.10 AOS release of MP/Pascal; tape and diskette are identical

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Appendix B
Operating Your Disk Drives

This chapter gives you brief instructions on how to operate your 6038/9 and 6095 disk drives. For more information, refer to *DGC Disc Drives Operator's Manual,* DG No. 014-000099.

Operating a 6038/9 Diskette Drive

A 6038 system includes one diskette drive for a 0.3 Mbyte diskette. The 6039 system contains two diskette drives. You may also order packets of 10 DGC blank diskettes.

Handling Diskettes

To prevent loss of data on your diskettes, you should observe several precautions.

- Never remove a diskette from its protective packet.
- Do not touch the parts of a diskette which are exposed at the various openings in the packet. Try to handle the packet only at the edges.
- Never bend or fold a diskette.
- Always store a diskette in its paper storage envelope and in a clean, dry environment. When it is not in use, return the diskette to its storage box and store it in an upright position.
- Use ONLY a felt-tipped pen to write on the identification label, and try to avoid writing on the label once it has been affixed to the packet.

Inserting a Diskette

To insert a diskette in a drive and prepare the drive for operation, you should follow the steps detailed below.

Remove a diskette from its white paper storage envelope. If you plan to write data to this diskette, use opaque tape to cover the "write protect" hole at the edge of the black diskette covering. Wrap the tape over the edge so that you cover both sides of the hole. (In most cases, you will want to cover the write-protect hole, because you cannot boot a system from a diskette with an open hole.)

Turn the diskette drive power switch to ON. The POWER ON indicator light will glow. Open the drive door by depressing the latch below the door. Slide the diskette into the drive with the label on the envelope facing up and out, and the "write protect" hole facing in. The diskette should slide in smoothly and come to a stop in the drive.

Close the door so that it latches shut. The READY light and TRACK 0 indicators will go on. If you left the write-protect hole on the diskette open, the WRITE LOCK light will also glow.

Removing a Diskette

Make sure the drive is powered up and the READY indicator is lit. Then open the drive door and slide the diskette out of the drive.

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Using a 6095 Disk Drive

A 6095 disk drive consists of two magnetic platters: a disk cartridge which you can remove and a factory-installed fixed disk which you cannot change. The system requires a cartridge to run.

You load the disk cartridge into a cavity at the top of the drive. The drive is on roller slides so that you can slide it out easily to interchange disk cartridges.

The removeable disk is permanently sealed inside the cartridge, and the read/write heads gain access to the disk through an opening on the side of the cartridge. When the disk cartridge is properly loaded in the drive, two horizontal arms, each supporting a read/write head, are positioned to straddle the disk.

Installing a Disk Cartridge in the Drive

Make sure the power switch is ON.

Push in the latches on the sides of the disk drive, and slide the drive gently out of the cabinet until it stops.

Remove the dust cover (if any) from the top of the drive.

Lift the cartridge out of its dust cover: With the cartridge handle flat, slide the latch plate to the left, hold it there, and pull up on the handle.

Holding the cartridge by the handle, with the opening for the read/write heads facing the back of the drive, place the cartridge in the cavity in the top of the drive. When properly positioned, the cartridge will fit into locating lugs, and will slide smoothly into the cavity and onto the spindle.

Lower the cartridge handle until it is flat on the cartridge.

Place the dust cover over the cartridge. Make sure it fits into the drive cavity properly.

Slide the drive back into the cabinet until the front panel latches engage the drive into place.

Set the LOAD/READY switch on the disk drive to READY. Wait for the READY indicator to light up (about thirty seconds).

Removing a Disk Cartridge from the Drive

Make sure the Power switch is ON.

Make sure the disk is **DISMOUNT**ed from the computer system. If you do not **DISMOUNT** the drive, you may lose data, and you will have to execute Fixup before you can **MOUNT** the disk or Bootstrap the system from it again.

Set the LOAD/READY switch to LOAD. Wait about thirty seconds, until the LOAD indicator lights up.

Release the front panel latches and slide the drive out of the cabinet until it stops.

Remove the dust cover from the top of the drive, exposing the cartridge.

Slide the latch plate on the cartridge to the left, lift the handle straight up, and carefully lift the cartridge up and out of the drive.

Place the cartridge into the dust cover and lower the cartridge handle until it is flat on the cartridge. The dust cover will magnetically latch onto the cartridge.

If you are not going to install another cartridge in the drive, place a spare dust cover in the cavity to minimize dust and dirt contamination.

Slide the drive into the cabinet until the front panel latches engage the drive in place.

Shutting Down the Disk Drive

Make sure that the disk has been **DISMOUNT**ed from the computer system. If you do not **DISMOUNT** the disk, you may lose data.

Set the LOAD/READY switch to LOAD, and wait about thirty seconds for the LOAD indicator to light up. If you wish, remove the disk cartridge.

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AOS Software Release for MP/OS

If you are going to develop MP/OS programs under AOS, you order the MP/OS software in one of two forms: magnetic tape, or diskettes.

The release comes in the form of three separate tapes, or five diskettes. The files are in AOS dump format. The first tape holds the same files as the first three diskettes. These files are the programs that you need to bootstrap the MP/OS system for the first time, the utility programs, and the SYSGEN programs.

In addition, if you ordered MP/FORTRAN IV or MP/Pascal, you receive the compiler and libraries on one tape or diskette for each language.

The tables below show the files that are contained on each diskette or tape.

Filename	Description
MICREM.OB	System Call Translator object file.
MMSL.LB	MP/OS System Call Translator subroutine library.
MASM.PS	Default Macroassembler symbol file.
MPID.SR	Instruction definition parameter file.
MPARU.SR	MP/OS user parameter file.
NBID.SR	NOVA instruction definition parameter file.
NSKID.SR	NOVA Skip instruction definition parameter file.
SYSID.SR	MP/OS system call definition parameter file.
MERMES	MP/OS error message file.
SYS_MERMES.OB	Object file of system error messages: used to build MERMES.
CLI_MERMES.OB	Object file of CLI error messages: used to build MERMES.
BIND_MERMES.OB	Object file of Binder error messages: used to build MERMES.
SPEED_MERMES.OB	Object file of Speed error messages: used to build MERMES.
MMAKEBOOT.PR	Program to make a stand-alone program bootable.
MLED.PR	Library builder program.
AOSMIC.PR	AOS - MP/OS file transfer program.

Table A.6 Contents of AOS release of MP/OS software: Diskette 1; all of the files are also on the release tape

Filename	Description
MBIND.PR and MBIND.OL	Binder program.
MDINIT.PR	Disk initialization program.
MFIXUP.PR	Disk repair program.
MMASM.PR	Macroassembler program.
MMASMXR.PR	Cross reference program for Macroassembler.
MFDISP.PR	File display and comparison program.
MFEDIT.PR	File editor program.

Table A.7 Contents of AOS release of MP/OS software: Diskette 2; all of these files are also on the release tape

Filename	Description
MSYSGEN.PR and MSYSGEN.OL	System generation program.
MPROMLOAD.PR	Prom burning utility program.
MSPEED.PR	Text editor program.
SYSG.BIND.CLI and SYSG.MASM.CLI	CLI macros used by the MSYSGEN program.
MICRON.PS	Macroassembler symbol file used by the MSYSGEN program.
MICRON.LB and MICRON2.LB	MP/OS system libraries.
MP100SCRIPT and MP200SCRIPT and MN601SCRIPT	MSYSGEN input files: used to create default program development systems.
SYSGEN.DATA	Data file used by MSYSGEN.

Table A.8 Contents of AOS release of MP/OS software: Diskette 3; all of these files are also on the release tape

Filename	Description
MICREM.OB	System Call Translator object file.
MMSL.LB	MP/OS subroutine library.
FORT4.PR	MP/FORTRAN IV compiler.
FORT4.LB	MP/FORTRAN IV run-time library.
FORT4.PS	Macroassembler symbol table for MP/FORTRAN IV
FORT4MT.LB	MP/FORTRAN IV multi-tasking library.
MERMES	Error message file.
SYS_MERMES.OB	Object file for system error messages: used to build MERMES.
FORT4_MERMES.OB	Object file for MP/FORTRAN IV error messages: used to build MERMES.

Table A.9 AOS release of MP/FORTRAN IV software; tape and diskette are identical